

APP3-5

Investigation of current distribution in an HTS twisted stacked-tape cable conductor by self-field measurements

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Various large current-carrying conductors composed of REBCO tapes have been proposed in recent years for high current applications such as magnets and power transmissions. As one of the conductors, a twisted stacked-tape cable (TSTC) is being developed at the Massachusetts Institute of Technology [1,2]. The TSTC conductor is composed of stacked REBCO tapes which are twisted along the longitudinal direction of the stacked tapes. The stacked REBCO tapes are immersed with a solder, and are imbedded in a copper former. Therefore, current transfer between REBCO tapes occurs easily when applying current in the TSTC conductor. In this study, self-field measurements of the TSTC conductor were conducted in order to investigate current distribution in the conductor. As a test sample, a 650 mm diameter single turn coil of a TSTC conductor was utilized. The current distribution in the TSTC conductor is discussed by using analytical models with the measured self-fields around the conductor.

[1] M. Takayasu, L. Chiesa, L. Bromberg, J. Minervini, HTS twisted stacked-tape cable conductor, *Supercond. Sci. Technol.* 25 (2012) 014011.

[2] M. Takayasu, L. Chiesa, N. Allen, J. Minervini, Present Status and Recent Developments of the Twisted Stacked-Tape Cable Conductor, *IEEE Transactions on Applied Superconductivity*, Vol. 26, No. 2 (2016) 6400210.

Keywords: REBCO tapes, twisted stacked-tape cable (TSTC), self-field measurements